FORMAL ASSESSMENT

Water Going Up, Water Going Down

Each activity in the Estuaries 101 Middle School Curriculum is designed around specific performance tasks. A generalized set of scoring rubrics is provided to judge student progress against these performance tasks. Use the performance assessment indicators in the table below along with the suggested answers in the Teacher Guide to arrive at a score for each performance task.

In addition, you can use the attached Student Assessment handout to conduct a formal assessment at the conclusion of the activity. Use the suggested answers and performance assessment indicators to rate each student's progress.

Performance Tasks	Performance Assessment Indicators		
	Low - Basic	**Medium - Proficient**	**High- Advanced**
The student can define and discuss how tides are generated by the sun, the moon, and the wind.	The response is partially correct. There is also evidence of inaccurate, incomplete, or inappropriate skills or knowledge.	The response is correct, and demonstrates accurate understanding of concepts. Minor inaccuracies may appear but there is no evidence of misconceptions.	Evidence of higher-level thinking and the application of the appropriate skills and prior knowledge. The response is correct and complete, and contains elaboration and extension. There is no evidence of misconceptions. Minor inaccuracies should not necessarily lower the score.
The student can examine graphs of data from two different sites to compare the mouth closure effects on water depths and dissolved oxygen levels.			
The student can describe the forces that naturally shape beaches and the advantages and limitations of artificial structures built to control beach erosion and deposition.			

Questions and Answers

1. **When did the mouth close at Old Woman Creek estuary shutting off Lake Erie from the estuary? How do you know?**

   The mouth closed on September 15, 2008. Water levels rose suddenly on that day and stayed high.

2. **Hypoxia is when there isn't enough dissolved oxygen in the water for aquatic creatures to live. What day did the water become hypoxic (DO less than 2 mg/L).**

   The water became hypoxic on September 20, 2008.

3. **After the mouth closed, there was an abrupt drop in dissolved oxygen. Then the levels of dissolved oxygen began to rise again. How do phytoplankton trapped in the estuary affect the DO levels?**

   Since the mouth is closed, phytoplankton inside the estuary are not flushed out into the lake. The phytoplankton populations increase. Photosynthesis by the phytoplankton increases the dissolved oxygen levels.

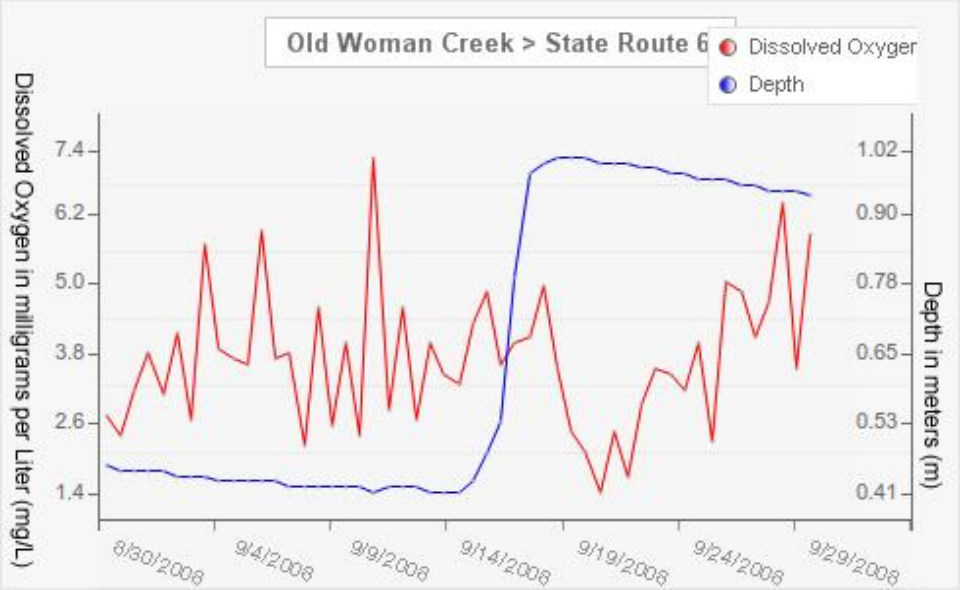
Reflection Question

[Student answers will vary]

STUDENT ASSESSMENT

Water Going Up, Water Going Down

Estuaries can change quickly, within hours or days. They are constantly shaped by water flowing from rivers as well as tidal cycles or storms moving and mixing freshwater in the estuary. Your challenge is to read the graph below and figure out what happened when a storm surge built up sand on the beach and closed the mouth to Old Woman Creek Reserve.



Examine the graph for Old Woman Creek Reserve and answer the following questions:

1. When did the mouth close at Old Woman Creek estuary shutting off Lake Erie from the estuary? How do you know?

2. Hypoxia is when there isn't enough dissolved oxygen in the water for aquatic creatures to live. What day did the water become hypoxic (DO less than 2 mg/L).

3. After the mouth closed, there was an abrupt drop in dissolved oxygen. Then the levels of dissolved oxygen began to rise again. How do phytoplankton trapped in the estuary affect the DO levels?

Reflection Question

How does a freshwater mouth closure created by wind action compare to an ocean beach closure created by tides?